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METHOD OF COMPACTING RESINOUS OVERLAYS

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This invention relates to an improved method of compacting and firmly bonding surface coatings formed by mortars of tacky resinous materials and stone aggregate to underlying paved surfaces.

In particular, it relates to a novel and efficient method of compacting and bonding hardenable mortars of tacky resinous materials and stone aggregates to underlying paved surfaces, such as concrete pavements, without the drawbacks which usually accompany such applications, namely, without the tacky components of the mortar adhering to the compacting means, such as rollers, and permitting thereby formation of uniform, unbroken, strongly compacted overlays atop the underlying paved surfaces.

These mortars are prepared by thoroughly mixing mineral aggregate with (1) a resin, such as an unsaturated polyester, and (2) a cross-linking monomer, such as styrene and (3) effective proportions of a catalyst (initiator) and a cross-linking accelerator. Once prepared, the mortar is applied to the surface to be coated in a known manner, for instance, by flowing on, screeding, spreading with a blade or the like. Thereupon a compacting means, such as a steel wheel roller is employed to compact the surface before it hardens (sets). Compacting is intended to fill all the fissures and unevennesses of the undersurface with the mortar and to leave thereon a uniform surface of an impervious overlay.

However, almost invariably some of the mortar overlay, irrespective of the nature of the resinous component of the mortar, adheres to the roller, thus breaking up the uniformity of the surface-coating, impeding the progress of the compacting machinery and ultimately creating if not an unsurmountable, then in all events a very onerous and messy job of cleaning the resin from the machinery.

The present invention provides a novel and effective method of compacting the resinous mortar overlay, which eliminates the problem of the mortar being pulled away in the process of compacting, because of the resin sticking to the rollers of the compacting machinery. Furthermore, it provides right upon compacting an effective, strong, impervious and non-skid overlay surface.

Specifically, the invention relates to a method of compacting effectively mixtures or mortars of polyester resins and graded aggregates, such as are described in the copending application of R. J. Schmidt and L. E. Santucci, Serial No. 194,720 filed on May 14, 1962, in the U.S. Patent Office. In essence, the method involves placing a sheet of a flexible film material on the mortar surface, just prior to applying thereto a compacting force, such as the weight (load) of a roller or other appropriate compacting means. Any flexible film, which is sufficiently strong mechanically to withstand compacting (rolling), does not adhere too strongly to the mortar surface, and thus can be readily lifted (peeled) from it by hand without being ripped, can be used as a protective interlayer film. In general this "peelable" film is from about 1 to about 10 mils in thickness, films of about 2 to about 5 mils being particularly satisfactory to use. Thus, films of various film-forming synthetic resins, such as polyethylene, polypropylene, polyamides and polymers of methyl methacrylate, as well as wax paper and cloth, glass-fiber cloth, and paper or cloth impregnated with

synthetic film-forming resins similar to those mentioned hereinabove, or with different rubbers, can be employed to act as the protective interlayer films. Polyolefin films and particularly polyethylene and polypropylene films, because of their high mechanical strength within a range of thicknesses from 1 to 5 mils, and also because of their availability and comparatively low cost, are preferred.

An unexpected result of applying the method of this invention consists in that by compacting (rolling) the mortar surface and immediately, or almost immediately (that is, within at most 5 to 10 minutes), removing the protective interlayer film before the mortar has set, an overlay with roughened (stippled-like) surface texture is obtained. This texture provides skid resistance, a valuable property indeed. Surprisingly, this roughened surface texture is observed to last despite being subjected to intense vehicular traffic.

Consistency of the mortar generally is not too critical as regards the texture (roughness) of the finished overlay surface. Thus in using a resin/sand mortar, such as polyester resin/graded sand mortar, and polyethylene interlayer films, compaction of the more fluid (soft), film-covered mortar provides a greater degree of roughness on the surface of the compacted and finally cured overlay than compaction of a less fluid, thicker polyester/sand mortar. It is noted that certain preferred combinations of resin/stone aggregate mortars and interlayer films provide a greater degree of desirable roughness of the surface of the overlay. This is the case of polyolefin films being used for compacting polyester resin/sand and epoxy resin/sand mortars. The exact mechanism underlying this "co-action" of the mortar and film materials is not fully understood. Nevertheless, the fact remains that whenever polyolefin films, such as polyethylene and polypropylene films, are used as interlayer films in the compacting method of the present invention, the surface of the compacted polyester resin or epoxy resin mortar overlay is found to be rougher and less likely to permit skidding.

The weight or load force imposed by the compacting means on the surface of the mortar covered by the protective interlayer film of resin, rubber, or wax-paper, in other words, the weight of the roller in the case of compacting machinery, such as a steel wheel roller, also is not critical. Usually, a roller applying force of from 5 to 60 lbs. per linear inch of the surface will produce a satisfactory, roughened and, hence, non-skid surface. In other words, the roller must be heavy enough to compact the mortar to a predetermined layer thickness which may be as low as ⅛". The surface of the compacting means or roller may be grooved or indented in any desired (regular or random) fashion to impart additional non-skid character to the surface of the overlay, so, however, as not to cut or otherwise damage the protective flexible film.

Accordingly, the choice of the thickness of this interlayer film within the broad range of 1 to 10 mils will depend on whether the compacting roller is smooth or, if indented, on the character of the indentation.

Where greater degree of skid resistance is desired, an application of a layer of fine angular grit to the surface of the compacted mortar before it is completely cured, will be advantageous.

In its simplest form, the method involves laying by hand a sheet of flexible film material, such as polyethylene or polypropylene or wax-paper, on the surface of the soft mortar, immediately after this latter has been poured on the paved undersurface and spread thereon (with blade spreaders or the like); then passing the compacting means (a roller) over the area covered by the flexible interlayer film, whereupon this latter is removed by hand in the manner similar to that of removing or peeling masking